

REMARKS

Favorable reconsideration of this application, in light of the following discussion and in view of the present amendment, is respectfully requested.

Claim 6 is added. Claims 1-6 are pending in the application.

I. Rejection under 35 U.S.C. § 102

In the Office Action, at page 2, claims 1-5 were rejected under 35 U.S.C. § 102(e) as being unpatentable over U.S. Patent Pub. No. 2003/0233906 to Weinhofer et al.

Claim 1

This rejection is respectfully traversed because Weinhofer does not discuss or suggest:

means for storing the calculated position of the controlled axis in association of the calculated position of the virtual axis; and

means for driving the controlled axis in a manner such that the controlled axis synchronously follows the virtual axis as a master axis in accordance with the position stored in said means for calculating the position of the controlled axis,

as recited in independent claim 1.

As a non-limiting example, the present invention as set forth in claim 1, for example, is directed to a position control device such that the movable parts of machines can be reversely moved if necessary. A position for a controlled axis is obtained based on command movement, and the position of a virtual axis with respect to time and an I/O signal are obtained. The controlled axis position obtained and the I/O signal state are used in the execution of a reversal operation when the operation of the machine is stopped.

Weinhofer merely discusses that "the axis block 12 controls the motor 44 responsive to inputs from the jog block 18, the move block 20, the time cam block 22, the gear block 24, and the position cam block 28", which allow the user to specify a new position and velocity of the motor shaft, an axis position as a function of time, a gearing relationship, and an axis position for the shaft of the motor as a function of a position of the shaft of another motor. Weinhofer further discusses that the axis block is coupled to output cam blocks, which are coupled by way of output blocks to output devices, "a cam profile comprising two cam elements that control an output device 50...[and] this relationship can be viewed as a master/slave relationship with the axis 12 representing the master and the output block 16 representing the slave" (para. 0035, lines 21-25). Weinhofer does not discuss or suggest that a position of the controlled axis is

calculated with respect to a calculated position of the virtual axis that is based on a fixed speed, and then driving the controlled axis in accordance with the calculated position of the controlled axis. Weinhofer merely discusses that the "servo drive 42 may be operative to control the speed of the motor 44..." (para. 0034, 5-6), but does not discuss or suggest storing a calculated position of the controlled axis in association with the calculated position of the virtual axis, where the virtual axis moves at a set speed.

Therefore, as Weinhofer does not discuss or suggest "storing the calculated position of the controlled axis in association of the calculated position of the virtual axis," and does not discuss or suggest "driving the controlled axis in a manner such that the controlled axis synchronously follows the virtual axis as a master axis in accordance with the position stored in said means for calculating the position of the controlled axis," as recited in independent claim 1, claim 1 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 102(e) rejection is respectfully requested.

Claim 2

Regarding claim 2, Weinhofer does not discuss or suggest:

means for storing the state of the I/O signal obtained by said
means for acquiring the state of an I/O signal in association with
the position of the virtual axis calculated by said means for
calculating the position of a virtual axis; and

means for carrying out control of the I/O signal in accordance with
the position of the virtual axis, based on the I/O signal state stored
in said means for storing the state of the I/O signal,

as recited in independent claim 2.

In an argument similar to that with respect to claim 1, Weinhofer does not discuss or suggest that a state of an I/O signal in association with the calculated position of the virtual axis is obtained and stored. Weinhofer also does not discuss or suggest carrying out control of the I/O signal in accordance with the position of the virtual axis, based on the stored signal state. Weinhofer discusses maintaining an I/O image table for each of the I/O devices, but makes no such mention of obtaining a state of an I/O signal in association with a calculated position of the virtual axis moving at a set speed. While Weinhofer does discuss that "latch/unlatch operations may be controlled based on multiple different possible event states," and that "the enable input can be any piece of I/O data that is available in the controller module 40," Weinhofer does not discuss controlling the I/O signal in accordance with the position of the virtual axis, based on the I/O signal state stored.

Therefore, as Weinhofer does not discuss or suggest “storing the state of the I/O signal obtained by said means for acquiring the state of an I/O signal in association with the position of the virtual axis calculated by said means for calculating the position of a virtual axis,” and Weinhofer does not discuss or suggest “carrying out control of the I/O signal in accordance with the position of the virtual axis, based on the I/O signal state stored in said means for storing the state of the I/O signal,” as recited in independent claim 2, claim 2 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 102(e) rejection is respectfully requested.

Claim 3

Regarding claim 3, Weinhofer does not discuss or suggest:

means for storing the position of the controlled axis with respect to the position of the virtual axis and the state of the I/O signal; and
means for carrying out the drive of the controlled axis and control of the I/O signal in a manner such that the controlled axis synchronously follows the virtual axis as a master axis in accordance with the position and the I/O signal state stored in said means for storing the position of the controlled axis and the state of the I/O signal ,

as recited in independent claim 3.

In an argument similar to that of claims 1 and 2 above, Weinhofer does not discuss or suggest that the position of the controlled axis with respect to the position of the virtual axis calculated and the state of an I/O signal obtained is stored. Further, Weinhofer does not discuss or suggest that the controlled axis is driven so as to synchronously follow the virtual axis in accordance with the position of the controlled axis with respect to the position of the virtual axis and the I/O signal state stored.

Therefore, as Weinhofer does not discuss or suggest “storing the position of the controlled axis with respect to the position of the virtual axis and the state of the I/O signal,” and Weinhofer does not discuss or suggest driving the controlled axis and controlling the I/O signal “such that the controlled axis synchronously follows the virtual axis as a master axis in accordance with the position and the I/O signal state stored in said means for storing the position of the controlled axis and the state of the I/O signal,” as recited in independent claim 3, claim 3 patentably distinguishes over the reference relied upon. Accordingly, withdrawal of the § 102(e) rejection is respectfully requested.

Claims 4-5

Claims 4-5 depend directly or indirectly from independent claims 1-3 and include all the features of their respective independent claims, plus additional features that are not discussed or suggested by the reference relied upon. For example, claim 4 recites that "said means for carrying out control of the I/O signal includes exclusive control means for preventing the I/O signal stored in said means for storing the state of the I/O signal and an I/O signal using a ladder from being written doubly." Therefore, claims 4-5 patentably distinguish over the reference relied upon for at least the reasons noted above. Accordingly, withdrawal of the § 102(e) rejection is respectfully requested.

II. New Claims

New claim 6 recites that the features of the present invention include "storing data on a position of a controlled axis with respect to a calculated position of a virtual axis and data on an I/O signal state with respect to the calculated position of the virtual axis; and executing a reversal operation based on the stored data on the position of the controlled axis and the data on the I/O signal state." Nothing in the references relied upon discusses or suggests such. It is submitted that new claim 6 patentably distinguishes over the reference relied upon.

Conclusion

In accordance with the foregoing, claim 6 has been added. Claims 1-6 are pending and under consideration.

There being no further outstanding objections or rejections, it is submitted that the application is in condition for allowance. An early action to that effect is courteously solicited.

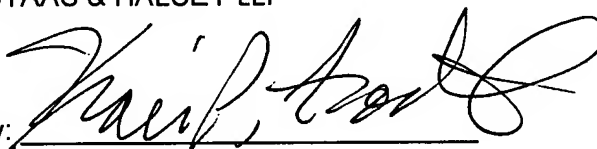
Finally, if there are any formal matters remaining after this response, the Examiner is requested to telephone the undersigned to attend to these matters.

If there are any additional fees associated with filing of this Amendment, please charge the same to our Deposit Account No. 19-3935.

Respectfully submitted,

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